IN THE SPECIFICATION

Please amend the following paragraphs:

[0041] Each of chambers 802-810 provides a lid ~~104~~ on the chamber body ~~102~~. During maintenance operations, the lid ~~104~~ can be actuated into the open position so that components inside the chamber body ~~102~~ can be readily accessed for cleaning or replacement as needed.

[0042] The chambers 802-810 are connected to a transfer chamber 840 that receives a wafer ~~842~~. The wafer ~~842~~ rests on top of a robot blade or arm ~~846~~. The robot blade ~~846~~ receives wafer ~~842~~ from an outside processing area.

[0043] The transport of wafers ~~842~~ between processing areas entails passing the wafers through one or more doors separating the areas. The doors can be load lock chambers 860-862 for passing a wafer-containing container or wafer boat that can hold about twenty-five wafers in one embodiment. The wafers ~~842~~ are transported in the container through the chamber from one area to another area. The load lock can also provide an air circulation and filtration system that effectively flushes the ambient air surrounding the wafers.

[0044] Each load lock chamber 860 or 862 is positioned between sealed opening ~~850 or 852~~, and provides the ability to transfer semiconductor wafers between fabrication areas. The load locks 860-862 can include an air circulation and filtration system that effectively flushes the ambient air surrounding the wafers. The air within each load lock chamber 860 or 862 can also be purged during wafer transfer operations, significantly reducing the number of airborne contaminants transferred from one fabrication area into the other. The load lock chambers 860-862 can also include pressure sensors ~~870-872~~ that take air pressure measurements for control purposes.

[0045] During operation, a wafer cassette on a wafer boat is loaded at openings ~~850-852~~ in front of the system to a load lock through the load lock doors. The doors are closed, and the system is evacuated to a pressure as measured by the pressure sensors ~~870-872~~. A slit valve (not shown) is opened to allow the wafer to be transported from the load lock into the transfer chamber. The robot blade takes the wafer and delivers the wafer to an appropriate chamber. A second slit valve opens between the transfer chamber and process chamber, and wafer is brought inside the process chamber.

[0047] FIG. 6 shows an exemplary an apparatus 40 for liquid and vapor precursor delivery using either the system 100 or the system 300. The apparatus 40 includes a chamber [[44]] 71 such as a CVD chamber. The chamber [[40]] 71 includes a chamber body that defines an evacuable enclosure for carrying out substrate processing. The chamber body has a plurality of ports including at least a substrate entry port that is selectively sealed by a slit valve and a side port through which a substrate support member can move. The apparatus 40 also includes a vapor precursor injector 46 connected to the chamber [[44]] 71 and a liquid precursor injector 42 connected to the chamber [[40]] 71.

[0050] After the substrate has been placed into the CVD chamber 71, it is heated by a heater ~~100 or 300, as discussed above~~. After the substrate has reached an appropriate temperature, valve 92 is closed and valve 95 is opened allowing the carrier gases 80 and 84 and the precursor vapor to enter the vaporizer 68 through the attached tube 96 attached tube 96. Such a valve arrangement prevents a burst of vapor into the chamber 71. The precursor 88 is already a vapor and the vaporizer is only used as a showerhead to evenly distribute the precursor vapor over the substrate 70. After a predetermined time, depending on the deposition rate of the copper and the thickness required for the initial copper deposition, valve 95 is closed and valve 92 is opened. The flow rate of the carrier gas can be accurately controlled to as little as 1 sccm per minute and the vapor pressure of the precursor can be reduced to a fraction of an atmosphere by cooling the precursor 88. Such an arrangement allows for accurately controlling the copper deposition rate to less than 10 angstroms per minute if so desired. Upon completion of the deposition of the initial copper layer, the liquid source delivery system can be activated and further deposition can proceed at a more rapid rate.

[0051] FIGS. 7A-7B show two operating conditions of an embodiment ~~600~~ to perform barrier pulsed plasma atomic layer deposition. FIG. 7A shows the embodiment ~~600~~ in a deposition condition, while FIG. 7B shows the embodiment ~~600~~ in a rest condition. Referring now to FIGS. 7A-7B, a chamber 602 receives gases through one or more gas inlets 604. A solid state plasma generator 605 is mounted on top of the chamber 602 and one or more plasma excitation coils 607 are positioned near the gas inlets 604. A liquid precursor system 606 introduces precursor gases through a vaporizer 609 into the chamber 602 using a precursor distribution ring ~~630~~.

[0054] Each computer program is tangibly stored in a machine-readable storage medium or device (e.g., program memory ~~522~~ or magnetic disk) readable by a general or special purpose programmable

computer, for configuring and controlling operation of a computer when the storage media or device is read by the computer to perform the processes described herein. The invention may also be considered to be embodied in a computer-readable storage medium, configured with a computer program, where the storage medium so configured causes a computer to operate in a specific and predefined manner to perform the functions described herein.